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PHYSIOLOGICAL INTRODUCTION TO THE STUDY
OF PHILOSOPHY

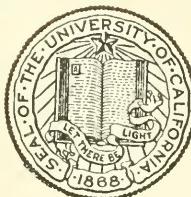
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A PHYSIOLOGICAL INTRODUCTION TO THE STUDY OF PHILOSOPHY

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A PHYSIOLOGICAL INTRODUCTION TO THE STUDY
OF PHILOSOPHY.¹

BY DR. SHEPHERD IVORY FRANZ,

Government Hospital for the Insane, Washington.

Author 1928

Although from time to time we read that much of so-called physiology is psychology, that too much of so-called psychology is physiology, that the physiology of the nervous system exists only by reason of psychological observations and that psychology must return more to introspective methods, there appears to be an agreement among teachers and text-book writers that a certain amount of physiology is necessary for psychological teaching and thinking. Opinions differ, however, regarding the *What?* and the *How Much?* of physiology that are essential or valuable. Beyond the barest outline of the physiology of the central nervous system and the special senses to be found in the text-books of psychology, where may the teacher or the student look for further knowledge? In English, Ferrier's *Functions of the Brain*, which was the standard at the time the reviewer was a student and which, although out of date, still remains in many respects unsurpassed, has not been succeeded by any single English work that may be utilized for the instruction of psychological students in what may be properly called physiological psychology. In both French and German, however, there are a number of books or parts of books that may be profitably placed before the more competent students of psychology, but unfortunately too few students are able to profit by the reading of the foreign language. Probably the most noteworthy of these works from the psychological standpoint are the excellent articles on the brain in Richet's *Dictionnaire de Physiologie*,

¹ *Introduction physiologique à l'étude de la philosophie.* J. GRASSET. Préface par M. BENOIST. Paris: Alcan, 1908. Pp. xii+368.

and those of von Monakow in *Ergebnisse der Physiologie*. In addition to these there are some special works dealing with the structure and function of the nervous system. Few, however, are like Grasset's work in that they have been written for the special or the probable use by students of psychology.

In the preface we are told by M. Benoist, the rector of the University of Montpellier, that the contents of the book were given in the form of lectures to students of philosophy in the university in accordance with a general plan of having specialists in the sciences and in other subjects allied to philosophy lecture on their own subjects to the students of philosophy and psychology. In addition to the lectures of Professor Grasset there were given lectures on certain fundamental principles of physics, biology, law and ethics, and history by the respective professors, as an indication of the value of these subjects to students of the more inclusive subject, philosophy.

Professor Grasset's book is not intended to be exhaustive in its treatment of the nervous system, but it is intended to give to students of philosophy and psychology facts and principles that may be of value to them in their work. It is divided into three parts: Definitions and Generalities; Psychic Functions; and Psychomotor and Psychosensorial Functions.

In the first part of the book is to be found the author's creed regarding the relation of physiology and psychology, and some general remarks pertaining to the point of view. The author believes that psychology and physiology are two sciences, not one science with two different aspects, as some physiologists would have us believe. Psychology is in close connection with philosophy, and it may be necessary to hold certain philosophical opinions in order to produce good work or consistent work. In physiology, however, one must have no philosophical opinions to advance and, further, one must have no special religious opinion to combat or to champion. On the other hand, the author holds that the physicist, the physiologist and neurobiologist can make their sciences serious and definite only if they have a real and a strong philosophical education. How unlike the usual or ordinary antagonism of scientists toward philosophy is the latter statement!

When we consider the body and its parts, their location and function, we are struck with the fact that the anatomical unity is not always the same as the functional unity. Thus in the stomach, an anatomical unit, there are a number of functional unities. In the study of life the functional unities are the important differentiating elements,

and it may be said that the individuality of an apparatus depends upon the function of that apparatus regardless of the geography or the topographical distribution of the apparatus or organ. "The history of the taste nerve is the best proof of the independence of the true physiological unities and of the false anatomical unities" (p. 336). It is the province of the physiologist, therefore, to determine the real unity of any organ or group of organs. In the nervous system it cannot be doubted that the anatomical unity is an artificial construction, for no one can say where the spinal cord begins and the medulla stops, nor where the cerebrum begins and the mid-brain ends, and we are compelled to concede the preponderating importance to the physiological or the functional view. In this sense we may take the remark of Lamarck: "The function creates the organ." The word organ has a definite meaning only from the physiological point of view, it is a something that does some definite thing. The organ is defined by the function that it accomplishes, and we may not properly speak of the spinal cord or of the cerebrum except in common language, because for the physiologist the spinal cord and the medulla oblongata and the cerebellum and the cerebrum do not exist as distinct unities, they are interrelated into one functioning organ. This standpoint has been taken throughout the book and we will look in vain for special discussions of the functions of the spinal cord and the peripheral nerves, or of any of the other anatomical divisions of the nervous system. We are to deal with the anatomical localization of functions, but more especially shall we read of the functions and their anatomical connections. In other words, for example, we are not to lay the emphasis on the location of the hearing centers in the temporal lobes or of the visual centers in the occipital lobes, but we must consider the relation of hearing and of vision to the nervous system as a whole. In the case of hearing it is the connection or the functional relation of the cochlear nucleus to the posterior quadrigeminal body, to the geniculate body, and to the temporal lobe that is of importance. In vision it is the similar relation of quadrigemina, geniculata, and the pulvinar and the occipital lobes that is to be considered. Moreover, in both these cases we must realize that the goal is not the cortex of the cerebrum, but that there are outgoing paths to take the centripetal impulses and to make them mean something for the individual by producing an outward expression. In this discussion the author considers the usual method of presentation of the functions of the nervous system and makes war on the habit of phylogenetic presentation, which must be largely anatomical. For the proper understanding of the functions of

the nervous system Grasset believes that we must first consider the most highly developed system and descend to the simple, not ascend from the simple to the complex. For the investigation and understanding of other bodily systems it may be advantageous to go from the amoeba to man, but we are able to understand the nervous system of the lower animals only after having considered the nervous system of man and not the reverse.

Part two is devoted to the 'psychic functions.' In this part the author discusses and defines some terms, divides mental states into two 'psychisms,' gives a critical résumé of the facts of anatomical localization of psychic functions, and considers the problem of responsibility and mental therapeutics.

The word psychic has not the same connotation as the words mental and consciousness. The psychic functions are defined as those in which there is 'thought'—not intellectual as opposed to affective, but both intellectual and affective—and which are produced or developed in the neurones of the cerebral cortex (p. 34). Consciousness is not necessarily a characteristic of a psychic state, and the mental is only a part of the psychic, for (interesting definition) psychic functions have their seat over all the cerebral cortex while the mental are located exclusively in one part or in parts of the cerebral cortex. The psychic functions are divided into the superior (voluntary and conscious) and the inferior (involuntary and unconscious), and for these two orders of psychic functions there are two different centers. The centers for the superior and the inferior psychic functions are, according to Grasset, respectively the frontal and the parieto-occipital parts of the cortex. He criticizes and combats the idea that both psychic functions are concerned with the same neurones, but with different degrees or intensities of activity, a position held by Janet, Dumas, Binet and Hitzig. To make his views more easily understood Grasset constructed the accompanying figure, which he later refers to as the 'polygon.'

In this figure *O* represents the superior psychic center or the center of conscious personality, of free will, of the responsible ego, which the author locates in the cortex of the prefrontal lobe. *A* is the auditory center, located in the cortex of the temporal lobes; *V* the visual center, located in the region of the calcarine fissure; *T* the tactile and general sensibilities, localized in the region about the fissure of Rolando; *W* the center for writing, in the cortex at the foot of the left second frontal convolution; *S* the center for speech, cortex at the foot of the left third frontal convolution; and *K* the kinetic

center or the center for general movements, located in the cortex about the fissure of Rolando. O represents all the neurones for the superior psychic functions, while the more numerous inferior psychic centers are represented by the polygon $WSKAVT$. To A go all the different auditory impressions, to V the visual, and to T the tactful and general sense impressions. From W there go out the impulses for graphic expression, from S those for verbal expression, and from K those for general bodily movement. This scheme represents only some of the important paths, and for completeness many more would need to be introduced from the sensory or the afferent side, such as those for taste and smell. In normal individuals, as shown

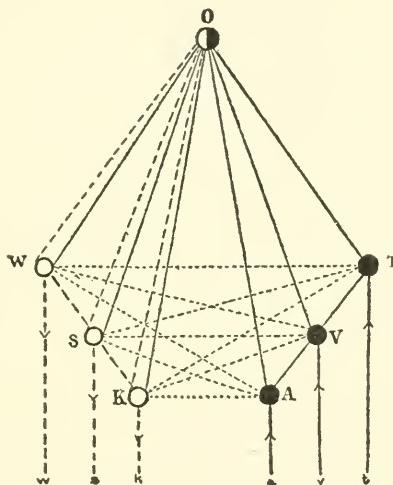


FIG. 1. Scheme of the center O and of the polygon $WSKAVT$.

in the figure, all the different centers are connected by association paths that assure collaboration and synergy. Between the superior psychic center O and the motor centers W, S, K the author assumes not only centrifugal paths, which permit the passage of impulses from the center O to the appropriate motor center, but also centripetal paths which transmit impulses from the motor centers to the higher center, whenever the activity of W, S, K , has been produced, whether by action of the center O or by the activity of the centers A, V, T in the inferior psychic level. This last form of discharge is apparently the substrate for a form of the 'feeling of inner-vibration.'

Using this scheme as a basis Grasset attempts to explain a number of borderland and pathological states, such as sleep and dreams, hypnosis, motor automatisms, hysteria and the insanities, and the aphasias. Lack of space prevents taking up more than a few of these in detail, but all are explained as disaggregation or dissociation of parts of the mechanism. Most are due, we are told, to a temporary or permanent functional break between the *O* and the lower polygon. In sleep, for example, there is a cessation of the function of the superior psychic *O*, although psychic activity is not entirely suspended. The continuation of the functioning of the lower psychic centers constitutes or is the neural basis of dreaming. Hysteria, which has been well described as "an enfeeblement of the faculty of psychological synthesis, a contraction of the field of consciousness, and a tendency to a more or less complete division of the personality with the formation of many independent groups," is readily understood if we accept the scheme of Grasset as indicating the manner in which all psychic states are constituted. The hysterias are from this standpoint disaggregations of the different parts of the polygon, the functional breaking away of the different parts that go to make up the normal mental process.

In the next chapter the author considers from the polygonal point of view a number of psychological problems: sensibility, ideas, attention, memory, imagination, the association of ideas and images, inspiration, reason and judgment, and will. Then follow discussions of the functions relating to the preservation and the growth of the life of the individual, of the social man, and of the species. In each of these chapters the physiological or normal function is explained and the author adds discussions of the pathology of the mental condition. In these two chapters there are collected most of the important facts of pathological psychology, a subject with which the author is thoroughly personally acquainted, in the selection of which there is shown rare good judgment.

Grasset next treats of the localization of the 'psychism' in the cerebrum. To the question: Is the psychism localizable in the cerebrum? he answers: it is localizable, but we must not hastily conclude that it has been localized. The facts regarding the sensory functions of the cerebrum are given, Flechsig's researches on the association tracts are mentioned and the opinions of many physiologists are cited to show that most investigators of the question believe the frontal lobe concerned with the higher mental processes, if we may speak of such. The author quotes the reviewer as in favor of this hypothesis, but it may be said that this conclusion was not and is not the opinion of the

present writer.¹ The conclusions which are made after the consideration of all the facts are that the superior psychism is not, as Janet and Joffroy conclude, merely due to a different degree of the activity of the same neurones that subserve the lower psychism, that the frontal lobes are not chiefly concerned with emotional conditions, such as gaiety or sadness, but that when they are diseased there is an escape from inhibition of the lower centers which become hyperactive, and that for the further investigation of the problem it is necessary to have more careful analyses of the mental phenomena in pathological cases.

Chapters follow on the physiopathological problem of responsibility, psychic functions in therapeutics, language, emotion and mimicry, general sensitivomotor function, orientation and equilibrium, vision, hearing, taste, smell, and the functions of nutrition. The chapters on responsibility and therapeutics are interesting largely to physicians, the former possibly also to ethical writers, although the author has published his conclusions regarding responsibility in more extended form in *Demifous et Demiresponsables*. In his discussion of language the author combats the opinions of Marie, who, it will be remembered, says that "the third frontal convolution plays no special rôle in the function of language." The neural processes in emotion are as follows: there is an excitation of certain sensory centers in which the sensation is 'perceived, becomes emotion, and from which go out a double efferent excitation'; there is a stimulation of the optic thalamus centers or rather of the basilar optic thalamic—striate nuclei centers, thence a stimulation of the inferior bulbo-medullary centers whence go the excitations for the visceral, circulatory, respiratory and

¹This is not the place in which to bring forward special evidence and to elaborate personal hypotheses, but to the reviewer the following tentative hypothesis appears to be the most acceptable: All parts of the cerebrum are engaged in intellectual processes. Or, to be more exact, we may say that all parts of the cerebral cortex are so engaged. Certain parts we know have definite sensory or perceptual functions, other parts are more intimately concerned with the production of movements, and still other parts are chiefly employed neither for sensation nor for movement, but for what has been called association. The two large and important areas, anterior and posterior, of association have the same general function, that of being connecting links between the sensory processes on the one hand and the motor products on the other hand. The two areas work in harmony, but the posterior receives impulses from the sensory centers and the anterior is mainly connected with the motor centers. In the formation of an association, the following neural processes are conceived to take place: stimulation of some sensory center or centers, transmission to the posterior association area, transmission to the anterior association area, transmission to the motor area, and impulse to lower motor centers.

digestive manifestations (p. 237). The emotion itself is due to certain discharges in the upper cerebral neurones. When an impression reaches the psychic neurones it produces the mental state sensation; "if the process be further complicated and it extend to a greater number of neurones the sensation becomes agreeable or disagreeable and there is pleasure or pain—if still further complicated we have an emotion, joy or sadness" (p. 83). The area about the fissure of Rolando is believed to be sensorimotor rather than divided into a motor region anterior to the fissure and a sensory region posterior to the fissure, as the clinical and physiological results teach. The occipital lobe is also both sensory and motor, and the hearing center has a similar combination of functions. The validity of these conclusions is, the reviewer believes, questionable in view of the many facts that have recently been collected by pathologists, clinicians and physiologists, and the author in these chapters appears an advocate and not a judge.

Although he uses his scheme of the polygon throughout and thus appears to have a materialistic standpoint, the author keeps in mind the fact that the mental state is not the anatomical nor the physiological condition. For him the mental state is something that is not the same as the action of the neurone, something that cannot be explained in terms of the physics and chemistry of nervous tissue. It is refreshing to pick up a book written by a physician and find that not only has the old anatomical standpoint given way to a functional one, but that the distinction is drawn between the purely functional and the mental.

Two serious defects of the work are the lack of an index and the absence of any quantity of references. Most of the references that are given are to French authors and magazines; full references to German authors are almost lacking, although names of both German and English investigators are mentioned.

For its standpoint and its numerous facts the book may be recommended; it appears to the reviewer that it will be more valuable to teachers than to students. For the use of students a little more anatomy would be helpful and this could be included without augmenting the size of the work if the chapters on responsibility and therapeutics were omitted. The illustrations are well selected and sufficiently numerous, and it is a relief not to find all the worn out cuts of earlier works. A translation of the book, with additions of chapters on anatomy, of an index and of a bibliography would fill one of the gaps in our series of physiological and psychological text-books.

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